

Community Guide to Boulder's

Climate ACTION PLAN



- *Progress Report*
- *Strategies and Programs*
- *Mobilizing the Community*
- *What You Can Do*

October 2009
City of Boulder

Dear Friends,

Climate change is real. While it may be difficult to appreciate on a daily basis, its effects are beginning to alter our environment, and our lives.

Many of you have already begun to make changes in your homes, businesses and daily habits to help reduce your impact on climate change. Our city departments have also been working diligently to make a difference. We are happy to report that our community supported efforts are having an impact.

Given local government's role in regulating land use, development, and building codes we are in a central position to make significant long-term shifts in our energy consumption. But it is not something we can achieve on our own. *Everyone has a role to play.*

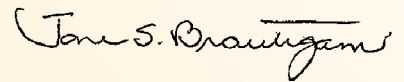
In partnership with Xcel Energy, Boulder County, local nonprofits and highly valued community volunteers in a growing number of neighborhood-based climate action groups, we have been able to reverse the growth of local greenhouse gas emissions. In 2008, our collective efforts helped keep roughly 81,000 metric tons of carbon dioxide from entering the atmosphere. We're not to our goal yet, but we're heading in the right direction.

We know we have much more to do, and that reaching the goal will not be easy. But we know it's possible. We encourage you to read this *Community Guide to Boulder's Climate Action Plan* to better understand what we have been doing, what we've learned in the process, and how we are retooling our efforts to be more effective. Perhaps most important, we hope it helps you understand how the Climate Action Plan relates to you—at home, at work, and on the road—and your own role in responding to this critical global challenge.

Sincerely,



Matthew Appelbaum
Mayor, City of Boulder



Jane Brautigam
Boulder City Manager

Crystal Gray, Deputy Mayor
Suzy Ageton
Macon Cowles
Angelique Espinoza
Lisa Morzel
Susan Osborne
Ken Wilson



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acknowledgments

*Thanks to those
listed at right and
the many other
community members
who devoted their
time and ideas
to creating the
Community Guide
to Boulder's Climate
Action Plan.*

City Council members

Matthew Appelbaum, Mayor
Crystal Gray, Deputy Mayor
Suzy Ageton
Macon Cowles
Angelique Espinoza
Lisa Morzel
Susan Osborne
Ken Wilson

Climate Action Plan Advisory Group members

Kai Abelkis, Boulder Community Hospital
Craig Eicher, Xcel Energy
Amy Ellsworth, The Cadmus Group
Gwen Farnsworth, E Source
Howard Geller, Southwest Energy
Efficiency Project
Sheila Horton, Boulder Area Rental
Housing Association
Ann Livingston, Boulder County Office
of Board of Commissioners
Pam Milmoie, Boulder County Public Health
Steve Mudd, Xcel Energy
Henry Mueller, Henry Mueller Design
Mona Newton, Governor's Energy Office
Paul Norton, National Renewable
Energy Laboratory
Brian O'Neill, Colorado Landmark Realtors
Francoise Poinssatte, Environmental
Advisory Board
Dan Powers, Boulder Chamber
Adriana Raudzens Bailey, Cooperative
Institute for Research in Environmental
Sciences
Michael Reid, E Source
Dave Roberts, National Renewable
Energy Laboratory
Ron Shaw, City of Longmont,
Environmental Sustainability
Moe Tabrizi, University of Colorado, Facili-
ties Management
Carol Tombari, National
Renewable Energy Laboratory

Environmental Advisory Board members

Suzanne Jones
Leah Martinsson
Francoise Poinssatte
Bill Roettker
Brian Vickers

Additional Climate Action Plan community strategists

Dennis Arfmann, Alison Burchell,
Ann Butterfield, Michale Brownlee,
Dane Cobble, Rob deKeiffir,
Eric Doub, David Driscoll, John Farmer,
Debbie Fox, Dan Friedlander,
Eric Gertler, Leslie Glustrom, AJ Grant,
Rob Hall, Jeff Hohensee, Karen Hollweg,
David Johnston, Jan Kreider, Bill leBlanc,
Jim Logan, Eric Lombardi, Hunter
Lovins, Marti Martsch, Jim Moscue,
David Neiger, John Nielsen, Bruce
Oreck, Micah Parkin, Dave Payne,
Susan Perkins, Steve Pomerance,
Paul Sheldon, Kevin Vranes, Tom Weis,
Dan Ziskin

City of Boulder

Jane Brautigam, City Manager
Paul Fetherston, Deputy City Manager

Department of Community Planning & Sustainability

David Driskell, Executive Director
Mary Ann Weideman, Acting
Deputy Director of Operations
Jonathan Koehn, Regional
Sustainability Coordinator
Kara Mertz, Local Environmental
Action Division Manager

Local Environmental Action Division Staff

Kevin Afflerbaugh, Yael Gichon,
Beth Powell, Sarah Van Pelt,
Marie Zuzack

Consultants

George Roche, Roche Designs
WPS Environment & Energy
(formerly Econergy)



Section one

Being ClimateSmart in Boulder

*No single country or
community can make a
significant impact;
but no significant impact
can be made without every
country and community
doing its part.*



Greenhouse gas emissions are causing global climate change, the impacts of which will be profound and long-lasting. Responding to the challenge of climate change requires a global effort and radical changes in the ways that we generate, use and conserve energy.

No single country or community can make a significant impact; but no significant impact can be made without every country and community doing its part.

In 2002, the Boulder City Council passed a resolution committing the city to achieving the targets established by the Kyoto Protocol, an international agreement adopted in 1997. Our goal is to reduce greenhouse gas emissions to 7 percent below 1990 levels by 2012.



In 2006, Boulder voters demonstrated their commitment to action by passing the country's first-ever carbon tax—a fee on energy consumption—to support programs that help achieve the community's climate action goal.

1990
base year
for GHG
reductions

1997
Kyoto
Protocol
signed

2002
Boulder
City
Council
adopts the
Kyoto
goals

2006
Boulder voters
pass the first
“carbon tax” in
the US; Council
adopts the
Boulder Climate
Action Plan (CAP)

2007
CAP programs
launched

2008
Boulder turns
the corner –
GHG emissions
start to decline

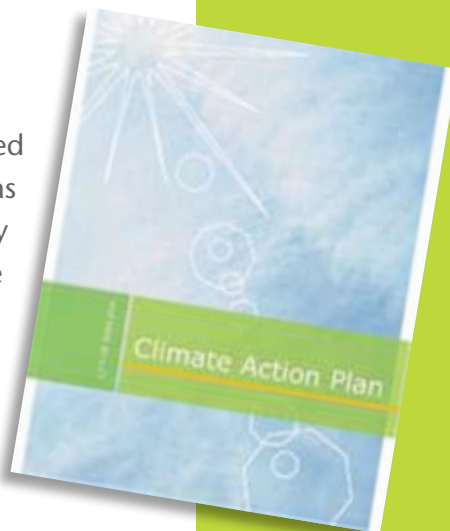
2009
CAP programs
revamped;
carbon tax
increased

2012
Target
year for
Climate
Action
Goal

timeline

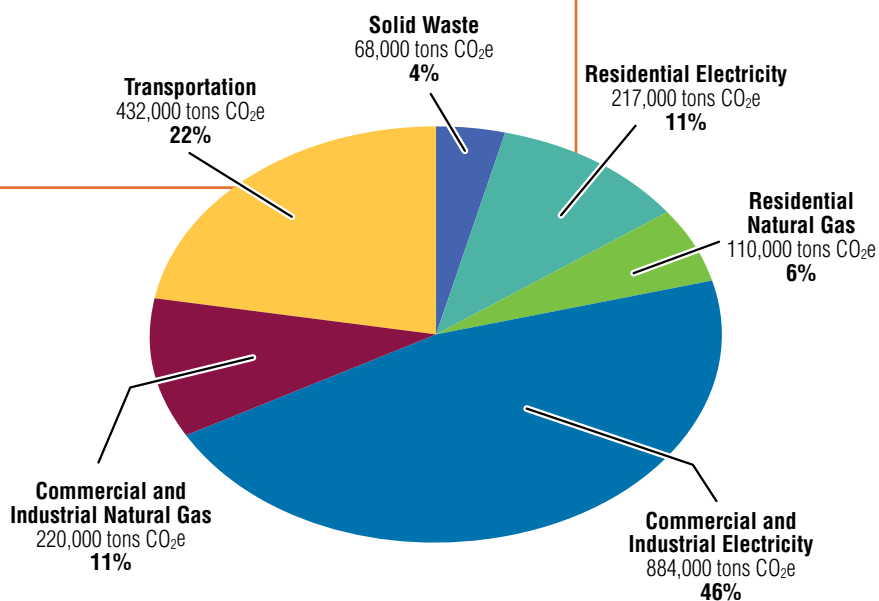
A Climate Action Plan for Boulder

The Climate Action Plan (CAP) is a set of strategies intended to guide community efforts for reducing greenhouse gas emissions. Those strategies have focused on improving energy efficiency and conservation in our homes and businesses—the source of nearly three-fourths of local emissions. The plan also promotes strategies to reduce emissions from transportation, which account for over 20 percent of our local greenhouse gas sources.



Where Do Greenhouse Gases Come From?

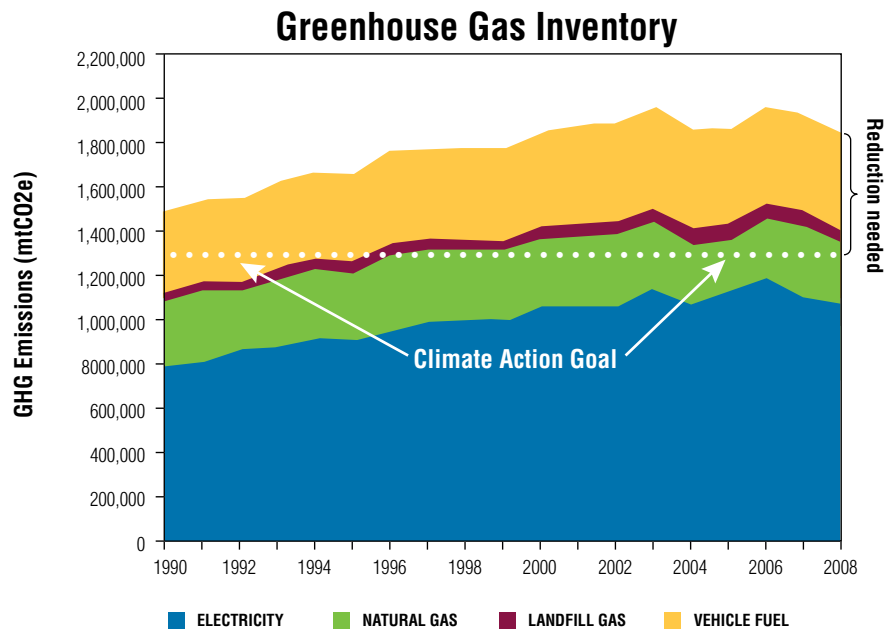
Calculating greenhouse gas emissions is complicated. But based on reasonable assumptions and available data, we can approximate the level of emissions generated by Boulder residents and businesses. In 2007, an estimated 1.9 million metric tons of carbon dioxide equivalent (tons CO₂e) were generated in Boulder. This includes data on electricity, natural gas, and solid waste as well as estimates of emissions from vehicle travel within the Boulder Valley (slightly larger than Boulder city limits).





On the Right Path

We've reduced local greenhouse gas emissions since 2006, but we have a ways to go...



The ClimateSmart™ programs of Boulder's Climate Action Plan have helped turn the tide of local carbon emissions, which had been growing consistently since 1990. These emission reductions have been achieved through actual reductions in energy use and because Colorado voters mandated cleaner energy in 2004 by creating the Colorado Renewable Energy Standard. We need to stay on the path to reducing emissions to achieve the Climate Action Goal.

Measuring Progress Toward the Goal

Tracking and forecasting greenhouse gas emissions is complicated. The city maintains an inventory of Boulder's greenhouse gas emissions that is primarily based on energy-use data provided annually by Xcel Energy. The inventory is also adjusted to take into account:

- the vehicle miles traveled within the Boulder Valley annually,
- Windsource and carbon offset purchases,
- biofuel sales, and
- the quantity of solid waste collected from businesses and residents.

Forecasting future greenhouse gas emissions is done for the city by its energy consultant, WPS Environment & Energy. Their forecast takes into account projected population and job growth, historical trends in

business and household energy use, and anticipated changes in the type of electricity generated in our region (for example, coal and natural gas versus wind and solar power).

Some of the greenhouse gas reductions the city tracks are not directly measured, but are estimated based on standard industry assumptions. Reductions that are long-lasting (for example, due to insulating a home) are cumulative—that is, they are counted as progress toward the goal each year through 2012. Reductions that are difficult to estimate, such as those due to conservation activities and public outreach, are *not* included in the city's forecast of progress toward the goal. However, their energy-saving effect will eventually be reflected in Xcel's energy-use data and thus future greenhouse gas inventories.

Change Comes in Many Forms

Changes in greenhouse gas emissions are affected by many factors, a number of which are beyond the city's control. Some of these factors will help the community reach the goal, while others make it more difficult to obtain.

Factors That HELP

- More non-carbon and low-carbon power generation being put online by Xcel Energy means that there will be less “carbon intensity” in the electricity that we use.
- Improved efficiency in the delivery of electricity, resulting from Xcel's Smart Grid.
- Less vehicle use despite commercial and residential growth, due to city and RTD efforts to increase transit use, bicycling, and walking.
- Improved fuel efficiency and the use of non-carbon and low-carbon fuel sources in new vehicles.
- More recycling and less solid waste, which will reduce the amount of methane gas coming from landfills.
- Collective efforts by everyone in Boulder to improve energy efficiency in our homes and businesses and to practice energy conservation on a daily basis.

Factors That DON'T Help:

- Continued growth locally, regionally and globally.
- Depressed prices for carbon-based fuels, making alternative cleaner fuel sources less cost-competitive.
- Continued increases in average electricity use by households and businesses.

Factors That Create VARIABILITY:

- Weather and atypical temperature fluctuations.
- Unforeseen behavior changes, including those due to economic conditions.





Getting to the Goal

Boulder's Climate Action Plan has been in effect since 2006. Since then we've made important gains. Among cities that rely on coal-fired power plants for their electricity, Boulder is one of the few in the US that has not only slowed, but reduced, its greenhouse gas emissions.

But that said, we still have a way to go. To meet our goal we must reduce greenhouse gas emissions by more than 400,000 metric tons by 2012.

How are we going to do it? Is it even possible? The answer is yes, but it will take a lot of work.

This document provides a roadmap to the goal, and serves as a supplement to the original Climate Action Plan. It aims to:

- 1) Serve as a "community guide"** to the Climate Action Plan so that every resident and business can easily answer the question: *What is Boulder's climate action strategy, and what can I do?*
- 2) Provide a progress report** on achievements to-date, including "lessons learned" from a comprehensive review of the 2008 strategies and programs (see Section Three).
- 3) Identify the path to the goal through strategies and programs** that have been re-tooled to ensure maximum effectiveness based on what we've learned from previous years' efforts (see Section Four).
- 4) Present social mobilization** as the umbrella for delivering climate action programs, education, outreach and reporting (see Section Five).
- 5) Emphasize that everyone must take action** to achieve the goal, not just city agencies and energy supply companies. Every Boulder resident, business, property owner, employer, worker and student needs to commit to change. Specific actions that *you* can take to reduce your "carbon footprint" are listed in Section Six.

the path

A white bus is shown from the front, with a digital display above the windshield showing 'HOP 2 CHAUTAUQUA' in orange LED lights. The bus has a Colorado license plate that reads '345 NNY'. The background is a dense green forest. A dotted line of yellow and white dots runs horizontally across the page, separating the title from the main content.

Section two

Strategizing for Action

*Boulder's Climate
Action Plan defines
six key strategy areas
to address greenhouse
gas emissions.
Together they provide
the structure for the
climate action programs.*

Six Key Strategy Areas

Boulder's Climate Action Plan defines six key strategy areas to address the major sources of greenhouse gas emissions (building construction and use, energy generation, transportation, and solid waste) as well as one opportunity for pulling carbon out of the air (commonly known as "planting trees").

Each strategy area is briefly described below. Together they provide the structure for the strategies and programs described in Section Four.

Strategy Area 1: Reduce Use

- *Retrofit existing buildings and replace appliances to improve energy efficiency.*
- *Promote energy-conserving behavior.*



Lowering energy use through improved energy efficiency and conservation is the easiest, most cost-effective way to reduce greenhouse gas emissions. Energy efficiency refers to ensuring that existing buildings are well-insulated and well-sealed to minimize energy waste and are heated, cooled, and lighted as efficiently as possible. It also means investing in energy-efficient appliances and fuel-efficient vehicles. Conservation means using less energy on a routine basis; for instance, by turning off lights and powering down computers when not in use.



Strategy Area 2: Build Better

- *Maximize opportunities for energy efficiency in new buildings.*

The best time to ensure maximum energy efficiency in buildings is when they are being designed and built. This can include siting buildings for solar access, building in passive and active solar systems, ensuring shading over windows, and making use of latest technologies for building insulation, circulation and energy supply. Boulder is implementing improvements in building construction through its nationally-recognized Green Building and Green Points programs.

Strategy Area 3: Ramp Up Renewables

- *Promote use of renewable energy sources for individual buildings and sites.*
- *Increase renewable sources in our regional energy supply.*



Solar, wind, and hydroelectric power emit virtually no greenhouse gases. Installations of photovoltaic systems (converting sunlight to electricity) and solar thermal systems (pre-heating water with sunlight) have increased sharply in recent years, thanks to rebates from Xcel Energy and federal tax credits. The City of Boulder operates seven hydroelectric plants and captures methane that is a by-product of wastewater treatment to generate electricity.

Another way that households and businesses support renewable energy is by subscribing to Windsource (wind power from Xcel Energy) and purchasing offsets from organizations like the Colorado Carbon Fund. While this has lower upfront costs than system installations, the greenhouse gas benefit lasts only as long as the subscription or purchase—usually a month or a year, respectively. After that, the wind energy or offset credit can be sold to someone else, possibly not in Boulder.



Strategy Area 4: Travel Wise

- *Increase the percentage of trips made by transit, bike and walking.*
- *Encourage the use of low-emission vehicles.*

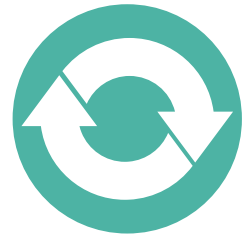
Boulder is a national leader in clean transportation and sustainable development: a high percentage of residents, workers and students bicycle or walk to get around, rather than drive. The city supports this by providing a growing network of paths, bikeways and lighted crosswalks, and by continuing its long-standing commitment to being a compact city. Boulder's extensive local bus service is also well-used by the community. But the push to increase clean transportation must be sustained, as almost a quarter of Boulder's greenhouse gas emissions are attributed to vehicle use. The city also encourages the use of low-emission vehicles through its fleet purchases and in encouraging priority parking for hybrid vehicles.





Strategy Area 5: Waste Not

- *Reduce and eventually eliminate the amount of waste going to landfills.*



Landfill waste emits methane, so reducing waste reduces greenhouse gas emissions. In fact, methane is 25 times more potent as a greenhouse gas than carbon dioxide. Boulder has set a goal of becoming a zero waste community. Through curbside collection of recyclable and compostable materials and a range of other recycling and re-use programs, the community's efforts to reduce its landfill waste will reduce greenhouse gas emissions.



Strategy Area 6: Grow Green

- *Plant more trees and protect the existing urban forest.*

Trees in the urban forest and on parks and open space absorb carbon dioxide, the most prolific greenhouse gas. Trees in the urban forest also reduce energy use in buildings by providing shade and blocking wind. Further, maintaining the city's urban growth boundary and directing growth to "infill" areas helps protect surrounding natural areas and green spaces.

protect

Program Principles

Boulder's Climate Action Plan is implemented through a set of programs designed to put each strategy area into action. These programs are summarized in Appendix A.

Achieving the right mix of programs is important. No single program will achieve the goal, and the programs should work together as a cohesive, interactive package to get results.

While "bang for the buck" in reducing greenhouse gas emissions is certainly the most critical overall consideration, there are other important considerations, too. Even when considering "bang for the buck," we need to consider: "Whose buck?" From one perspective, we want to maximize the impact of the city's carbon tax. But we also want to give careful consideration to the expected private investment, ensuring that it generates cost savings within a reasonable timeframe to justify the initial investment.

The following are the guiding principles considered by the city when developing the complete mix of climate action programs. The Program Evaluation Matrix in Section Four indicates the extent to which each program meets each principle.

Essential. *Every program must:*

- Maximize greenhouse gas reductions
- Be cost effective
 - Minimize the tax dollars spent per greenhouse gas ton reduced
 - Include a reasonable expectation for private investment and payback time

Desired. *Whenever possible, programs should:*

- Engage the community in action
- Leverage or fill a gap in other efforts (such as other agencies' programs or financial incentives)
- Be proven (have a proven track record, be easy to implement and control, and have a high likelihood of success)
- Be measurable (result in readily measurable greenhouse gas reductions)
- Be visible (highly visible in the community and have broad appeal)





Progress Report

Section three

*Over the last two years we have laid the
groundwork for achieving further reductions
in greenhouse gas emissions.*

Over the last two years, Boulder's Climate Action Plan (CAP) programs, related city efforts, and other community initiatives and investments have worked to lay the groundwork to achieve further reductions in greenhouse gas emissions. This section highlights accomplishments through 2008 in each of the six key strategy areas (described in Section Two) and briefly describes lessons learned along the way.

Strategy Area 1: Reduce Use



The Approach

- Conducted outreach and education to create awareness of Boulder's Climate Action Goal.
- Offered programs and technical assistance on how to reduce our greenhouse gas emissions.
- Encouraged the community to take voluntary action to conserve and improve energy efficiency by communicating the potential cost savings and environmental benefits.
- Provided financial incentives for selected efficiency improvements.
- Leveraged incentive programs provided by other entities.

The Accomplishments

- Reduced community emissions by approximately 6,700 tons CO₂e in 2008 through CAP energy efficiency programs.

Other accomplishments included:

Energy Audits:	750 single family homes 30 multi-family residential buildings 75 businesses
Insulation Rebates:	106 households
Conservation Kits:	550 households
CFL & LED Bulbs:	34,000 compact fluorescent light bulbs (CFL) distributed or discounted 3,700 incandescent holiday lights exchanged for LED light coupons
10 for Change:	45 businesses committed to reducing their energy use by 10 percent
Other:	10 neighborhood climate action groups received CAP assistance

The Lessons

- **Energy Audit Follow-up.** Homeowners and businesses owners have been very interested in getting energy audits to make informed decisions about improving energy efficiency. More follow-up with homeowners is needed after the initial audit to assist them with implementation.
- **Multi-Family Audits.** Energy audits and follow-up for multi-family buildings have been particularly challenging because there are often multiple property managers, and because managers change. Also, tenants and landlords often have different priorities when it comes to making energy improvements and lowering utility bills. We need to find ways to address this “landlord/tenant split incentive.”
- **10 For Change.** Businesses responded well to the “10 for Change” challenge, and many took quick action to reduce energy use. Participation is expected to grow steadily.
- **Voluntary vs. Mandatory.** Although residents are undertaking voluntary actions, these efforts have been slow to show significant results. Additional regulatory approaches would accelerate results.
- **Neighborhood Climate Action Groups.** Many neighborhoods have formed climate action groups and more are in the making. This has proven to be an effective method for reaching residents. The city will continue motivating and assisting neighborhood efforts and will track their progress.
- **Measuring Results.** Measuring greenhouse gas reductions is a new challenge for both the City of Boulder and Xcel Energy. Much of the information needed to measure reductions—and the methods for gathering it—have not historically been available. The city and Xcel Energy are working together to generate the data needed to measure progress toward the goal.

Strategy Area 2: Build Better



The Approach

- Phased-in energy efficiency requirements for new construction, additions, and re-models through the city’s Green Building and Green Points programs.

The Accomplishments

- Updated city residential building codes for new construction, additions and re-models to require energy efficiency levels 30 to 75 percent higher than the 2006 International Energy Conservation Code (IECC).
- Updated city commercial building codes to be at least 30 percent more efficient than the 2006 IECC.



- Improved the energy efficiency of 76 new residential buildings through updated codes.
- Reduced community emissions by approximately 1,100 tons CO₂e in 2008.

The Lessons

- **Voluntary vs. Mandatory.** Codes that mandate higher performance measures transform the market faster than voluntary green building programs.
- **Cost Savings Over Time.** Building sustainably reduces the need for future retrofits.
- **Third-Party Verification.** Using third-party verification for energy efficiency compliance reduces the burden on city departments and promotes green jobs in the community.

Strategy Area 3: Ramp Up Renewables



The Approach

- Informed property owners of the availability of Xcel Energy rebates and federal tax credits for installation of small-scale renewable energy systems.
- Promoted Windsource subscriptions and renewable energy credits through the Wind Challenge program.
- Worked with the Colorado Public Utility Commission and Xcel Energy to lower the barriers to large-scale renewable energy systems.
- Tracked photovoltaic and solar thermal system installations as well as other renewable energy programs for their contribution to greenhouse gas reductions.

The Accomplishments

- Reduced community emissions by approximately 60,000 tons CO₂e through renewable energy activities (including the city's hydroelectric and cogeneration facilities).
- Awarded \$25,000 in solar thermal rebates to seven recipients (half of the funding from the Governor's Energy Office).
- Awarded nearly \$90,000 in ClimateSmart Solar Grants to 12 non-profit facilities and affordable housing units.
- Recorded community purchase of Windsource and renewable energy credits totaling three percent of Boulder's electricity use.
- Installed solar photovoltaic systems donated by the Center for Resource Conservation and Bella Energy on three city buildings, providing up to 30 percent of the energy for each building. Another system is under construction at the city's wastewater treatment plant.

The Lessons

- **Strong Demand, Substantial Incentives.** The community has been willing to make significant investment in solar installations, in part because a large portion of the costs is covered by Xcel Energy rebates and tax incentives.
- **Windsource.** Promotion of Windsource can be incorporated into ongoing outreach programs rather than a separate campaign.

Strategy Area 4: Travel Wise



The Approach

- Continued to expand the network of paths, bikeways and lighted crosswalks throughout the city.
- Continued to work with RTD on plans for new regional bus and rail facilities for the Transit Village in the area around 30th and Pearl streets.
- Worked with local gas station owners to increase the availability and sale of ethanol (E85) and biodiesel.
- Continued to improve the fuel efficiency of the City of Boulder's fleet vehicles.

The Accomplishments

- Recorded a three percent decline in regional vehicle travel between 2007 and 2008, including a six percent decline in vehicle trips entering Boulder on the Diagonal Highway and US 36. This equates to a reduction of 13,500 tons CO₂e.
- Found a 2.4 percent decrease in single-occupant vehicle trips in the 2008 Boulder Valley Employee Survey.
- Increased local transit ridership by eight percent and regional ridership by 13 percent between 2007 and 2008.
- Avoided approximately 33,000 tons CO₂e annually through the Eco Pass program. (These tons are not counted separately, as they are already accounted for in the greenhouse gas inventory.)
- Recorded 119,000 gallons of biofuel sold in Boulder in 2008.





The Lessons

- **Biofuel Controversy.** Due to concerns regarding biofuels impact on the food supply, plans to increase availability and use of these fuels in Boulder have been discontinued. Supporting biofuels may be added to the CAP programs as more sustainable fuels become available.
- **Gas Prices.** The spike in gas prices contributed to short-term changes in travel behavior in 2008. The city's continued investment in alternative mode infrastructure, programs and services provided residents and employees with more opportunities to reduce their driving.



Strategy Area 5: Waste Not



The Approach

- Worked with residents, businesses, local trash haulers, and nonprofits to reduce the amount of landfill waste through recycling, re-use, and composting.
- Collaborated with Western Disposal, Eco-Cycle, the Center for Resource Conservation, and Boulder County on continued development of "Recycle Row," to create upgraded centralized facilities for drop-off of recyclable and re-usable materials.

The Accomplishments

- Helped Boulder County Recycling Center launch single-stream recycling.
- Worked with local trash haulers to launch community-wide residential curbside compost collection.

The Lessons

- **Making Recycling Simple.** Single-stream recycling is essential to meet Boulder's Zero Waste goal. For the program to be successful, we need to assist residents with learning the new system.
- **Managing Waste Locally.** Using local facilities to process and manage our waste stream contributes to community sustainability by creating local jobs and minimizing transportation impacts.

Strategy Area 6: Grow Green



The Approach

- Replaced trees in public spaces as funding allowed through the city's urban forestry program.

The Accomplishments

- Replaced 112 trees in street rights-of-way and city parks in 2008.

The Lessons

- **Need to Increase Tree Plantings.** Over the last several years the city's tree replacement ratio has been less than 1:1, whereas our goal is 2:1. To meet this goal we'll need to plant about 400 trees per year.
- **Tree Plantings as Piece of the Strategy.** Efforts to reduce emissions by protecting and growing our urban forest need to be measured, increased and incorporated as a formal strategy for meeting the Climate Action Goal.
- **Tree Management and Health.** The city has been working on pest management to try to reduce damage and mortality of existing trees from pine beetle and other tree pests and diseases.

growth





Getting
to the Goal

Section four

*The climate action challenge can
seem daunting, but it is achievable.*



The Path to the Goal

Boulder’s 2012 climate action goal can seem daunting, but it is achievable. Based on the programs described in this section, the following table summarizes the current estimates of projected impacts for each strategy area in moving us toward the goal.

CAP Strategy Area	2012 Greenhouse Gas Reduction (tons CO ₂ e)	% of 2012 Goal
Reduce Use	269,000	65%
Build Better	9,400	2%
Ramp Up Renewables	87,000	21%
Travel Wise	25,000	6%
Waste Not	6,400	2%
Grow Green	To be determined	
Total	396,800	96%

Note that the projections total 96 percent, rather than 100 percent of the goal. The remaining four percent, or more, could be achieved by a number of factors that are too uncertain at this time to quantify in terms of greenhouse gas reductions. These could include: federal and state legislative changes, such as a federal “cap and trade” program or expansion of the Colorado Renewable Energy Standard; the outcome of franchise negotiations with Xcel Energy; and Public Utility Commission (PUC) actions that will help to “decarbonize” the power we receive. Although the city does not have direct control over many of these factors, it is active in lobbying for change.

Also, note that the path to the goal outlined here represents current thinking on the best course of action. However, because addressing this type of challenge is uncharted, we know it will need to be adjusted over time. Thus, this document represents a snapshot in time for strategies and pro-

effective

grams that will evolve as we move forward. Progress toward the goal will continue to be tracked; projections will be updated annually; and programs will be monitored and modified as needed. This process of evaluating and adjusting programs will continue to involve the remarkable array of scientific and technical experts who live and work in Boulder. A community Climate Action Plan (CAP) strategy team and six technical teams specializing in different topic areas will continue to help city staff design,

revisit and revamp climate action efforts. Twice yearly, these technical teams will also host a community CAP Summit to engage the community in monitoring progress and strategizing new ways to meet the goal.

It is important to understand that programs alone will not get us to the goal. Success depends on full-scale, broad-spectrum participation by individuals, businesses, organizations and all levels of government. By changing daily behaviors and operations, by improving energy efficiency in buildings and vehicles, and by shifting to less carbon-intensive energy sources, we can get to the goal and do our part to help turn the tide on global climate change.

Creating an Effective Package of Programs

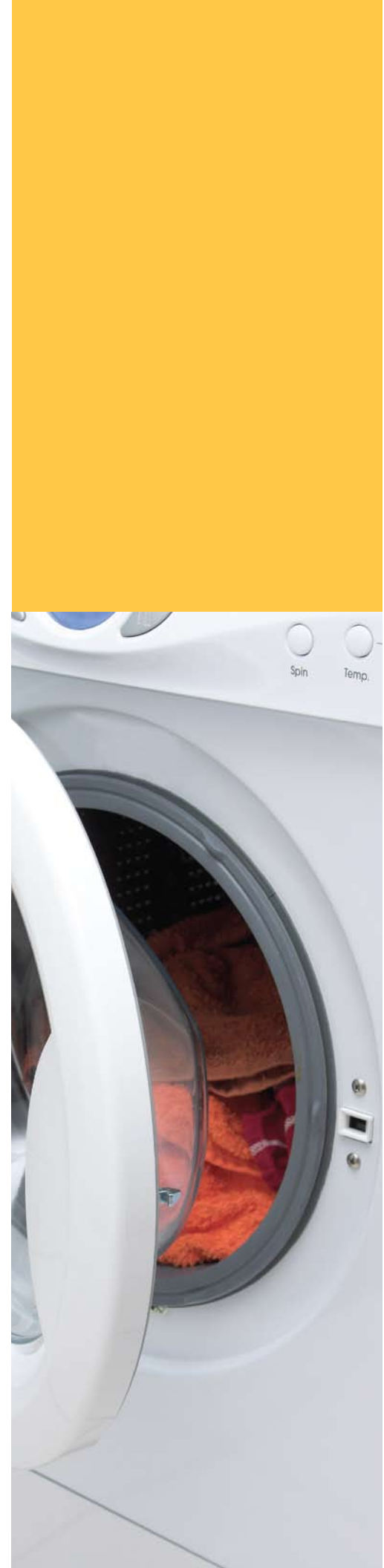
CAP programs have been carefully selected and refined according to the guiding principles described on page 11. The extent to which each program meets each principle is indicated in the table on the next page. While not every program performs highly for every principle, the overall package of programs performs well as a comprehensive strategy.

Detailed quantitative information on each program is provided in Appendix A, including measures such as lifetime energy savings and total investment per ton of reduced carbon emissions.


Funding CAP Programs

While many city activities that help move us toward the goal are funded through the city's regular operating and capital budgets (for example in transportation), most of the programs outlined in this document are funded by Boulder's CAP tax. With the aim of achieving and surpassing our 2012 Climate Action Goal, City Council raised the CAP tax in July 2009 to the maximum level approved by voters in 2006. Along with the tax increase, council accepted the outline of a new CAP strategy that was developed in collaboration with community members, City Council, city boards and staff. The additional revenue from the CAP tax increase will be used to: deliver climate action programs to a higher percentage of households and businesses; increase financial incentives for energy efficiency improvements; and increase support for Eco Pass programs. Additional funding for programs is expected through the American Recovery and Reinvestment Act and federal and state grants.

American Recovery and Reinvestment Act Funding (pending final approval in October 2009)	
City organization performance contracting	\$400,000
BikeShare program	\$250,000
Commercial "Two Techs and a Truck"	\$200,000
Residential "Two Techs and a Truck"	\$167,000
Total	\$1,017,000



PROGRAM EVALUATION MATRIX

 2010 Programs	Guiding Principles						
	GHG Reduction Maximizes greenhouse gas reductions	Cost Effectiveness Minimizes investment per ton reduced (both city and private \$)	Leverages / Fills Gap Leverages funds from or fills gap in other agencies' programs	Easy to Measure Results in readily measured greenhouse gas reductions	Proven Proven track record, easy to implement/ control, likelihood of success	High Visibility Is highly visible in community and has broad appeal	Engages Community Engages the community in action
1. Reduce Use							
ClimateSmart at Work							
Commercial "Two Techs and a Truck"
10 For Change
Commercial ClimateSmart Loan Program and Other Financing
Energy Code for Existing Commercial Buildings (CECO)
City Organization Energy Strategy Team
Regional Sustainability
ClimateSmart at Home							
Residential "Two Techs and a Truck"
Smart Grid
Residential ClimateSmart Loan Program and Other Financing
Energy Code for Existing Residential Buildings (RECO)
2. Build Better							
New/Remodel Commercial Building Energy Code
New/Remodel Residential Building Energy Code
3. Ramp Up Renewables							
WindSource and Renewable Energy Credits Promotion
ClimateSmart Solar Grants and Sales Tax Rebates
Xcel Energy Franchise Renewal
Public Utilities Commission and State Legislature
Community-wide Solar Installations
City Hydroelectric and Cogeneration
City Organization - Renewables
4. Travel Wise							
GO Boulder
City Organization - 90% Alternative Fuel Vehicles and Plug-In Hybrid Electric Vehicles
5. Waste Not							
Waste Reduction
6. Grow Green							
Urban Forestry

KEY . low .. medium ... high

Climate Action Strategies, Programs & Targets

Strategy Area 1: Reduce Use



The Challenge

Energy use in buildings accounts for 74 percent of greenhouse gas emissions in Boulder. Reducing these emissions requires changing the way we maintain and use buildings.

The Opportunity

Changing the way we maintain buildings (through insulation, switching to compact fluorescent bulbs, etc.) requires investment but results in real cost savings. And changing our behavior (turning off lights and unplugging unused appliances) is not only cost-free, it saves money. Through conservation and greater energy efficiency we can realize a real return on investment, both economically and environmentally.

The Strategies

Promote energy efficiency in existing buildings and conservation behavior through programs targeted to households (ClimateSmart at Home) and businesses (ClimateSmart at Work).

- **Blanket the community** with packages of energy reduction measures delivered directly to homes and businesses:
 - Teams of authorized auditors and contractors will visit up to 10,000 Boulder households and 3,000 businesses to provide a free introductory package, including a “clipboard” audit and information on energy efficiency, renewable energy, vehicle maintenance and alternative transportation options, waste reduction programs, and financial incentives.
 - Follow-up “tech team” visits will be offered for more extensive energy improvements and assistance.
 - “Tech team” visits will be rolled out neighborhood by neighborhood to help build visibility and a sense of participation in a larger movement.

Program: Residential and Commercial “Two Techs and a Truck”

ClimateSmart at Home

- **Directly install basic energy reduction measures** during introductory energy audit visits:
 - replace incandescent bulbs with compact fluorescent bulbs; and
 - install programmable thermostats, low-flow showerheads, and clothes drying racks.

Program: Residential “Two Techs and a Truck”

SMART GRIDCITY™



- **Educate homeowners** on the cost savings they can realize through small and moderate-size investments that achieve “payback” within one to five years, including:
 - insulating and air sealing their homes; and
 - upgrading to more energy-efficient appliances.

An example of cost savings and payback times for a high energy-use home is provided in Appendix B.

Program: Residential “Two Techs and a Truck”

- **Work with authorized contractors to arrange bulk-rate pricing** for energy improvement installations.

Program: Residential “Two Techs and a Truck”

- **Assist homeowners in applying for available rebates**, tax credits, and ClimateSmart loans for energy-efficiency improvements and solar installations. Consider further incentivizing home energy improvements by supplementing and “filling the gap” in these financial programs, particularly for low income residents.

Programs: Residential “Two Techs and a Truck”

Residential ClimateSmart Loans and Other Financing

- **Follow up on home energy assessments** sponsored by the city in 2006, 2007 and 2008 and by Xcel Energy in 2009 to provide individualized support for improvements.

Program: Residential “Two Techs and a Truck”

- **Maximize impact of the Smart Grid**, Xcel Energy’s new technology that will serve 25,000 households this year. The technology will reach both homeowners and renters, providing real-time feedback on their energy use. The city and Xcel Energy are currently exploring how to coordinate outreach and education efforts. Homeowners with a smart meter will be oriented to the Smart Grid Web portal during introductory “tech team” visits.

Programs: Smart Grid

Residential “Two Techs and a Truck”

- **Consider requiring energy efficiency improvements** to existing residential buildings. Propose regulations for rental housing in late 2009 or early 2010 and explore regulations for owner-occupied housing thereafter.

Program: Energy Code for Existing Residential Buildings (RECO)

ClimateSmart at Work

- **Provide businesses with individualized support** for energy efficiency improvements, including:
 - direct installation of higher efficiency lighting;
 - HVAC system tune-ups;
 - cost-benefit analysis for additional recommended improvements;
 - behavior/use change suggestions.

Program: Commercial “Two Techs and a Truck”

An example of a cost-benefit analysis for energy improvements to a relatively large commercial building is provided in Appendix B.

- **Work with authorized contractors to arrange bulk-rate pricing** for energy improvement installations.

Program: Commercial “Two Techs and a Truck”

- **Assist commercial property owners** in applying for available rebates, tax credits, and ClimateSmart loans for energy-efficiency improvements and solar installations. Consider further incentivizing energy improvements by supplementing and “filling the gap” in these financial programs.

Programs: Commercial “Two Techs and a Truck”
Commercial ClimateSmart Loans and Other Financing

- **Challenge businesses to participate** in a friendly competition to reduce their energy use by 10 percent. Make a special effort to engage industrial users and federal labs.

Program: 10 for Change

- **Educate and assist businesses and contractors** on energy-related topics through workshops, the Boulder Chamber Climate Leaders series, and collaboration with other city departments and programs. Further, encourage downtown retailers to model conservation behavior and lower their energy bills by not propping open their doors when air conditioning systems are running.

Program: Commercial “Two Techs and a Truck”

- **Consider requiring energy efficiency improvements to existing commercial buildings.** Phase in regulations over two to three years.

Program: Energy Code for Existing Commercial Buildings (CECO)

- **Expand partnerships and information** exchange with CU-Boulder and Boulder Valley School District to meet climate goals.

Program: Regional Sustainability

- **Lead by example** by continuously improving energy efficiency in city buildings and incorporating conservation practices in building operations.

Program: City Organization Energy Strategy Team



The Targets

Reduce Use			
	Progress Indicator	2010 Budget	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
ClimateSmart at Home	3,300 households per year	CAP funds: \$592,400 (37% of CAP budget)	132,000 (32% of goal)
ClimateSmart at Work	1,000 businesses per year	CAP funds: \$888,600 (55% of CAP budget)	137,000 (33% of goal)

* CAP funds are based on CAP tax rates increased in 2009 and do not include American Recovery and Reinvestment Act funds.

Strategy Area 2: Build Better



The Challenge

Energy use in buildings accounts for 74 percent of greenhouse gas emissions in Boulder. Changing the way we construct buildings can have a significant impact on energy savings over time, and reduce greenhouse gas emissions.

The Opportunity

Constructing buildings so that they are more energy efficient can cost more money up front, but saves significant amounts of money over time.

The Strategies

Promote energy-efficient construction through the city's Green Building codes.

Evaluate current Green Building codes for possible revisions or adoption of an international standard code.

- **Continue to implement residential energy efficiency codes**, requiring new and remodeled residential structures to perform at 30 to 75 percent greater efficiency (depending on structure size) compared to standard codes. Also, evaluate our residential Green Points program against an international green building code to determine which has the greatest ease of implementation.

Program: New/Remodel Residential Building Code

- **Continue to implement commercial energy efficiency requirements** adopted in 2008 which require new and remodeled commercial structures to be 30 percent more efficient compared to standard codes, and evaluate potential expansion of the commercial energy efficiency requirements in the coming year.

Program: New/Remodel Commercial Building Code

The Targets

Build Better		
Progress Indicator	2010 Budget*	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
Increased energy efficiency requirement in building codes	CAP funds: \$0 Other city funds: \$17,300	9,400** (2% of goal)
* Budget does not include American Recovery and Reinvestment Act funds.		
** Based on continuation of current building codes. Will be higher if codes are revised to increase energy efficiency requirement, though only modestly higher given the limited number of buildings that would be affected.		

Strategy Area 3: Ramp Up Renewables



The Challenge

Renewable energy installations have high upfront costs and relatively long payback periods. In addition, there are regulatory barriers and infrastructure limitations to development of large-scale renewable energy systems, such as wind farms. While renewable energy credit purchases allow households and businesses to offset their fossil fuel use, the purchases do not necessarily result in permanent reductions in local greenhouse gas emissions.

The Opportunity

The switch from greenhouse gas-emitting sources of energy to renewable energy sources is underway, but will take time. Generous rebates from Xcel Energy and federal tax credits have greatly increased the number of households, businesses and institutions installing small-scale solar photovoltaic and solar thermal systems..

The Strategies

Increase Boulder's use of clean energy by de-carbonizing our energy supply and developing wind and solar systems, including large-scale regional facilities and small-scale installations on homes, businesses and institutional buildings.

- **Work at the local, regional and state level** to gradually shift our fuel mix from a heavy reliance on carbon-intensive fuel sources, such as coal, to cleaner energy sources, such as natural gas, wind, solar and other renewable energy sources.

Programs: Xcel Energy Franchise Renewal
Public Utilities Commission and State Legislature
Smart Grid

- **Remove the barriers to development** of large-scale renewable energy systems and encourage the installation of residential and commercial solar projects.

Programs: Community-wide Solar Installations
City Organization – Renewables

- **Educate residents and businesses** about renewable energy options.

Programs: Residential and Commercial “Two Techs and a Truck”

- **Provide incentives** for solar installations by providing solar sales tax rebates to homeowners and businesses and grants to nonprofits and affordable housing.

Program: ClimateSmart Solar Grants and Sales Tax Rebates





- **Encourage participation** in Xcel Energy's Windsource program or voluntary carbon offset programs to demonstrate an increased demand for renewable power.

Programs: Windsource and Renewable Energy Credits Promotion

The Targets

Ramp Up Renewables		
Progress Indicator	2010 Budget*	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
9% increase in Windsource, renewable energy credits and carbon offset purchases; 20% increase in community-wide solar installations	\$28,000 (2% of CAP budget) Other city funds: \$310,000	87,000** (21% of goal)
<i>* Budget does not include American Recovery and Reinvestment Act funds; CAP funds are based on CAP tax rates increased in 2009.</i>		
<i>** This could be substantially higher depending on the outcome of the Xcel Energy franchise renewal, Public Utilities Commission interventions and federal and state legislative changes.</i>		

Strategy Area 4: Travel Wise



The Challenge

Vehicle use accounts for over 20 percent of Boulder's greenhouse gas emissions. Although our investments in transit, bike paths and other strategies have achieved significant reduction in local driving, we still depend on cars to meet many of our transportation needs. We need to drive less and use more efficient vehicles if we are going to meet the goal.

The Opportunity

It's relatively easy to get around Boulder on foot, by bicycle or by bus, thanks to our extensive local and regional transit system; transit pass (Eco Pass) programs; and network of paths, underpasses and street crossings. Getting out of the car not only helps clear the air, but also promotes healthy living, saving money in fuel and lowering medical costs, too. In addition, fuel-efficient vehicles are more prevalent and affordable now, and new technologies like plug-in hybrids are becoming a reality. The investments outlined in our Transportation Master Plan and related programs are our primary tools for reducing vehicle emissions. CAP resources are used to further promote alternatives to driving.

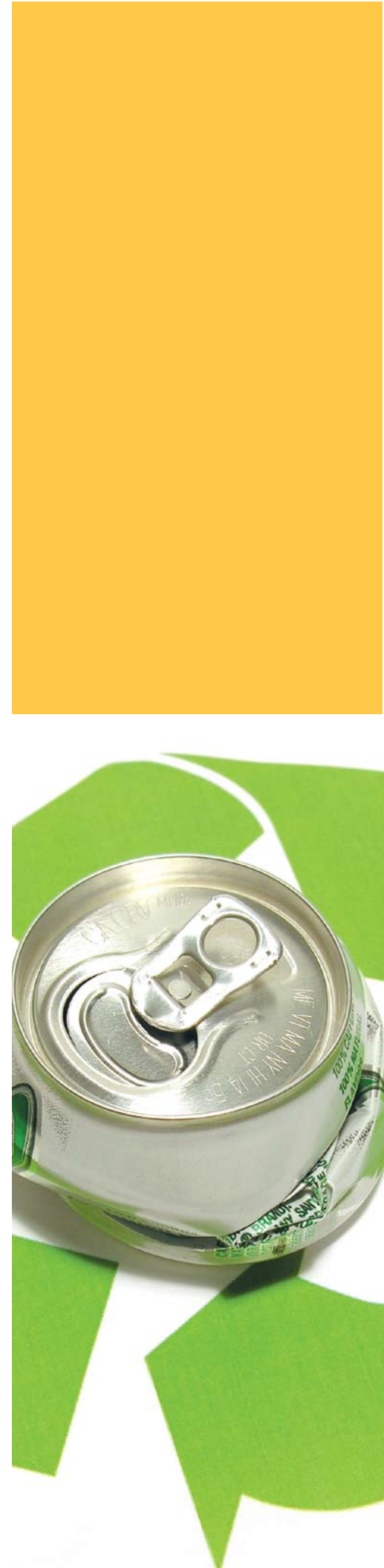
The Strategies

Reduce emissions by driving less and increasing the use of fuel-efficient vehicles and non-fossil fuels.

- **Use CAP funds to meet demand for Eco Pass** subsidies and to retain participating Eco Pass businesses and neighborhoods.
Program: GO Boulder
- **Use CAP funds to expand GO Smart**, an individualized marketing campaign for residents, and the Eco Pass Improvement Campaign, customized marketing and outreach for businesses, to increase pick-up rates and transit use among existing Eco Pass businesses and neighborhoods.
Program: GO Boulder
- **Promote vehicle maintenance** that increases fuel efficiency.
Program: Residential and Commercial “Two Techs and a Truck”
- **Pursue federal funding for a CarShare program** for the city vehicle fleet and a community-wide BikeShare program.
Program: GO Boulder
- **Continue converting Boulder’s fleet vehicles** to more efficient and lower emission models as they are replaced. As a Smart Grid project, convert city hybrid vehicles to plug-in hybrids with vehicle-to-grid capability (which allows Xcel Energy to use vehicle battery power).
Program: City Organization – 90% Alternative Fuel Vehicles and Plug-in Hybrid Electric Vehicles
- **Continue to implement trip reduction strategies** through ongoing implementation of Boulder’s Transportation Master Plan; improved transit service; parking management techniques, such as shared parking areas and parking maximums; regional collaboration; pursuit of state and federal grants; and transportation demand management policies, such as trip generation allowances.
Program: GO Boulder

The Targets

Travel Wise		
Progress Indicator	2010 Budget*	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
Reduction in vehicle travel	CAP funds: \$100,000 (6% of CAP budget) Other city funds: approximately \$3,000,000**	25,000 (6% of goal)
* Budget does not include American Recovery and Reinvestment Act funds; CAP funds are based on CAP tax rates increased in 2009.		
** GO Boulder budget.		



Strategy Area 5: Waste Not



The Challenge

Waste in landfills emits methane, a potent greenhouse gas. Although Boulder residents are generally avid recyclers—having reduced our landfill waste by nearly 40 percent—we still have a long way to go to meet our Zero Waste goal.

The Opportunity

New single-stream recycling and curbside compost collection programs were launched in 2008, and their full potential for waste reduction is yet to be realized. Also in the making is Recycle Row, a series of upgraded centralized facilities for drop-off of recyclable and re-usable materials. Our continued efforts to reduce landfill waste will help reduce methane emissions, and may also help reduce costs and vehicle emissions from transporting landfill waste outside the city.

The Strategies

Continue to work with the community, trash haulers, Boulder County and nonprofits to make waste reduction, recycling and re-use easier and cheaper than trash disposal.

- **Continue outreach and education** on single-stream recycling and curbside compost collection to help people understand that it has benefits beyond reducing the waste stream, including helping to lower greenhouse gases.

Program: Waste Reduction

- **Develop new programs** to incorporate into the outreach and education activities for ClimateSmart at Home and at Work.

Program: Residential and Commercial “Two Techs and a Truck”

- **Continue to work toward implementation** of Recycle Row in partnership with Boulder County, Eco-Cycle, the Center for Resource Conservation and Western Disposal Inc.

Program: Waste Reduction

The Targets

Waste Not		
Progress Indicator	2010 Budget*	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
60%-70% reduction in landfill waste by 2012	CAP funds: \$0 Other city funds: \$1,800,000	6,400** (2% of goal)
* Budget does not include American Recovery and Reinvestment Act funds; other city funds are based on trash tax rates increased in 2009.		
** To be revised based on 2010 update to Master Plan for Waste Reduction.		

Strategy Area 6: Grow Green



The Challenge

Most of our climate action strategies focus on reducing greenhouse gas emissions. But trees and other plants don't emit carbon dioxide; they pull it out of the air. In urban areas like Boulder, the loss of trees is not only an aesthetic loss, it also reduces the environment's ability to clean the air. But while planting a tree seems easy, it has to be cared for. Many trees are lost due to lack of care, which is a particularly challenging issue in an arid, urban environment. Over the past few years the ratio of trees planted to trees lost in Boulder has been less than 1:1. In other words, our urban forest is shrinking.

The Opportunity

In addition to absorbing greenhouse gases, trees provide energy savings in the form of shade and wind protection, as well as aesthetic appeal.

The Strategies

Continue and expand tree planting and care programs.

- **Collaborate with local groups and schools** to undertake tree planting efforts.
- **Seek resources** to support and better promote urban forestry programs, such as grants from Denver's Tree by Tree program and donations from nonprofits.
- **Continue the "Trees across Boulder" program** with the sale of trees through the Center for Resource Conservation.
- **Continue to purchase trees** at a discount from the former Cherry Creek Tree Farm to plant in parks, greenways and street rights-of-way.
- **Reinitiate the Commercial Tree Program**, planting trees in commercial areas.
- **Explore including education** on tree planting and proper tree care in the "Greening the Hill" program and the Residential and Commercial "Two Techs and a Truck" programs.
- **Explore tools and resources** for tracking tree removals, replacements and new plantings and for quantifying these effects on greenhouse gas emissions.
- **Adopt a tree preservation ordinance** that clarifies the city's policies for tree protection.

Program: Urban Forestry





The Targets

Grow Green		
Progress Indicator	2010 Budget*	Greenhouse Gas Reduction (tons CO ₂ e) in 2012
2:1 ratio of trees planted to trees removed	CAP funds: \$0 Other city funds: \$18,000	To be determined
<i>* Budget does not include American Recovery and Reinvestment Act funds.</i>		

Going beyond the goal

The climate action strategies and programs are formulated to not only reach our climate action goal by 2012, but also lay the groundwork for continued reductions and transform Boulder into a model low-carbon community. We know that some of the efforts made now to reduce our carbon impact will not have a significant impact for ten years, or longer. For example, meaningful environmental education in our schools has some near-term benefit, but the aim is to change the behavior and attitudes of the next generation. We know from experience that these kinds of changes can be powerful. Which 40 or 50 year old of today can remember their parents recycling?


Also worth mentioning: Greenhouse gas emissions don't stop or start at our city limits. The problem is regional, national and global. Our strategies not only need to meet local reduction targets; they also need to help meet the real target of global greenhouse gas reduction. Reducing greenhouse gas on a global scale necessitates action at every level—individual, local, national and international. While this document focuses on our local actions related to climate change, we will continue to work with regional, state and national partners to promote policies and practices for long-term sustainability and meaningful reduction in greenhouse gas emissions.



Mobilizing the Community to Achieve the Goal

Section five

*Our success ultimately will come
down to the individual decisions
each of us makes every day.*



The central message of Boulder's Climate Action Plan is that everyone has an important role to play. Over the past three years, the city has focused on awareness and education to help the community move toward the 2012 goal. The emphasis has been on encouraging people to make better decisions and informed investments to reduce their carbon footprint, as our success ultimately will come down to the individual decisions each of us makes every day.

While we have been moving in the right direction, a recent review of our progress indicates that the scale and motivational force behind the climate action message needs to be broader and stronger. More urgency and excitement is needed around achieving the goal. Greater community engagement must be inspired and facilitated to meet the 2012 goal. Getting more people to embrace and actually take action toward the goal calls for creating a local social movement for climate action.

The Path to Action

Social mobilization will be the umbrella for delivering climate action programs, education, outreach and reporting to everyone who lives, works, shops and plays in Boulder. It has the potential to integrate a broad range of community action efforts into a cohesive whole with one clear measure of success: reducing greenhouse gas emissions.

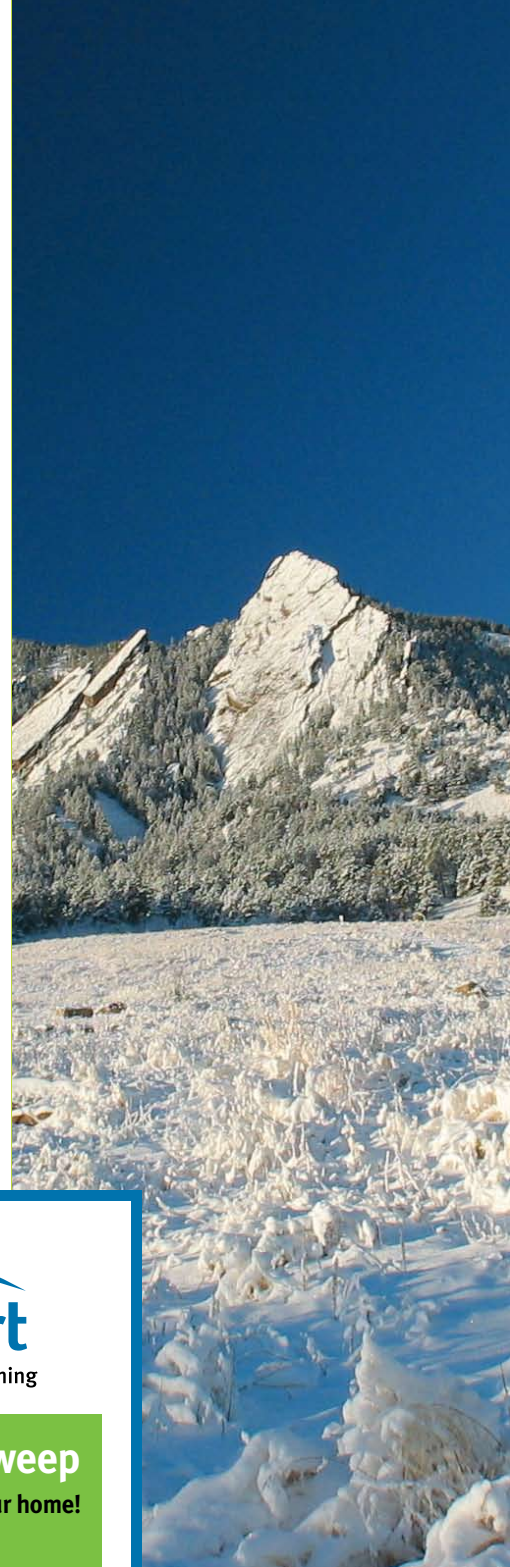
Key components of the social mobilization campaign will include:

- **Change agents:** Identify change agents in the community—community leaders, neighborhood groups, social and business networks, and other organizations—and involve them.
- **Compelling goal:** Ensure the goal is made meaningful and compelling.
- **Interim goals and measurable outcomes:** Create interim goals with measurable outcomes to build momentum toward the ultimate goal and provide doable steps on a defined timeline.
- **High-leverage actions:** Identify simple, immediate, high-leverage actions that, if done on a broad scale, will achieve the interim goals.
- **Communication:** Communicate these actions, interim goals and progress toward the 2012 goal to the community regularly. Use sound bites to convey small, specific actions and achievements.
- **Visibility:** Make actions and results highly visible to the community, to build interest and motivate others to participate.
- **Transparency:** Provide easy tools for individuals and groups to monitor and share their results and compare them to others'.

- **Competition:** Set up competitions between groups to add urgency and excitement.
- **Connect actions to achievement:** Demonstrate a clear connection between individual and group actions and the achievement of the community's goal, so there is broad understanding that the two are inextricably linked.
- **Education:** Educate on how and why particular actions do matter.
- **ClimateSmart:** Re-brand ClimateSmart and incorporate current social marketing techniques into the social mobilization campaign.

The social mobilization campaign will be designed and launched in the fall and winter of 2009 by a consultant experienced in creating local social movements. The effectiveness of the campaign will be monitored, and modifications will be made as needed.

A key element of implementing the campaign will be to redesign the ClimateSmart Web site. More interactive and timely features will be added to boost community excitement and motivation. A new web-based portal will enable individuals, businesses and groups to compare their climate actions and results with their peers and to track progress toward the goal.



Working Together to Reduce Global Warming

Neighborhood Energy Sweep

ClimateSmart energy kits delivered to your home!
This Saturday, 9:30 am - 2:00 pm

www.beClimateSmart.com



What YOU Can Do

Section • SIX

*Reducing greenhouse gas
emissions is everybody's business.
You CAN make a difference.*

Reducing greenhouse gas emissions is everybody's business. This section is intended to turn the abstract concept of greenhouse gas emissions into tangible actions you can take in your home or business. The options presented below are by no means exhaustive; but they provide real examples of what you can do. You CAN make a difference.

If you're a relative newcomer to climate action, consider starting with two tools easily accessible on the ClimateSmart Web site:

- **Know your score:** Calculate your carbon footprint (it's easy, and even fun), and learn how to reduce it by going to www.beClimateSmart.com.
- **Pledge now:** Take the pledge to reduce your carbon footprint at www.beClimateSmart.com.

You can use the suggestions in this section to do your part and reduce your carbon footprint.

Footprint Facts:

- Energy use in the average Boulder household creates 12 tons of greenhouse gases per year.
- Vehicle use by the average Boulder resident creates six tons of greenhouse gases per year.
- Businesses range from small retail shops to large corporations, so carbon footprints for businesses vary widely.
- To meet our goal, the community needs to reduce its footprint (i.e., greenhouse gas emissions) by 30 percent!



Reduce Use



You'll be surprised how much energy and money you can save by taking a few simple actions.

- **Get an energy audit** of your home or business to identify the most strategic investments for energy savings. Visit www.beClimateSmart.com to learn more.
- **Turn off lights and electronics** like TVs and computers when not in use. Using a power strip can make it easier to turn them off.
- **Turn office equipment completely off** at night and on weekends.
- **Run full loads** of dishes and laundry (on cold water setting).
- **Shorten showers and reduce dryer use.** Try an indoor drying rack or clothesline.
- **Use a programmable thermostat or energy management system** to adjust temperatures when you are not home or your business is closed.
- **Turn down the temperature** of your hot water heater to 120 degrees.
- **Add insulation** and seal your home or business to keep it warmer in the winter and cooler in the summer.

- **Install high efficiency lighting** like compact fluorescent lamps (CFLs) or light emitting diode (LED) lighting.
- **Buy ENERGY STAR® appliances and electronic equipment** (TVs and office equipment)—don't forget to recycle the old ones!
- **Replace your air-conditioner** with an evaporative cooler or a whole-house fan.
- **Tune-up your mechanical systems** (heating, air conditioning and ventilation) to ensure high operating efficiency.
- **Install motion sensors** to automate lighting.
- **Use Xcel Energy, ClimateSmart rebates and federal tax incentives** to reduce upfront costs of your energy improvements.
- **Apply for a low-interest ClimateSmart Loan** to cover remaining costs.

By taking these actions, you can reduce your carbon footprint by at least three tons of greenhouse gases per year. See Appendix B for examples of emissions reductions for a high energy-use home and a large commercial building.

Recycle.

Don't keep that old fridge in your garage. It's an energy hog and should be retired and recycled.

If you have a Smart Meter at home, in the near future you'll be able to log onto Xcel Energy's Smart Grid Web portal to monitor your electricity use in 15 minute intervals, see the results of your energy-saving actions, and come up with new ideas. You will receive information on this from Xcel in the coming months!

Reduce.

Reduce the number of mini-fridges at your workplace. Consolidate into one or more full-size ENERGY STAR® refrigerators.



Build Better

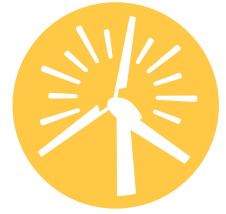
Greener building isn't the wave of the future – it's here now.

If you're planning to build, expand or remodel, ask your contractor to design for higher energy efficiency than the building code's minimum requirements. Your investment will pay back in energy cost savings. Try to achieve a near-zero or net-zero energy designation for your home or commercial building! It will save you money in the long run.

By building with higher energy efficiency than required by the building code, you can save at least five tons of greenhouse gases per year.



Ramp Up Renewables



Everyone can use renewable, no-carbon power.

There are many options to invest in renewables whether you rent or own your home or office space. Costs range from low monthly fees (average \$3) to larger investments that pay back over the long term.

- **Install solar photovoltaic (electric) and/or solar thermal (hot water) panels.** A large portion of the cost will be covered by rebates from Xcel Energy and federal tax credits. The ClimateSmart Loan program provides loans paid back through your property taxes.
- **Subscribe to Windsource,** an Xcel Energy program that enables households and businesses to buy wind-generated (rather than coal-generated) electricity.
- **Offset your fossil-fuel use by purchasing carbon offsets.** This option is perfect for energy reductions you find hard or impossible to achieve, such as commuting miles required for your job. The Colorado Carbon Fund—Project C—offers offsets from Colorado emission reduction projects. For information, visit www.coloradocarbonfund.org. You can even receive a Project C license plate by offsetting 50 percent of your vehicle travel.

Windsource.

Windsource is the largest customer-driven green energy program in the nation, and Boulder residents participate at a higher rate than elsewhere in Colorado. The wind power is produced in or near Colorado

By installing solar or subscribing to Windsource, you can reduce your carbon footprint by at least three tons of greenhouse gases per year.



Travel Wise



Make walking, biking, taking the bus or carpooling—instead of driving alone—part of your regular routine.

Start small—by trying one or two trips that way—and expand from there. More than 20 percent of Boulder's emissions are from vehicle use, and we could all benefit from a little more walking and biking!

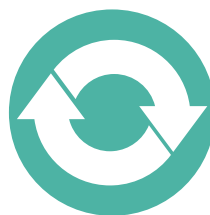
- **Use our carbon calculator** to determine your transportation carbon footprint at www.beClimateSmart.com. To get an idea, a 2007 Outback wagon driven 10,000 miles per year generates four tons of greenhouse gas emissions.

- **Visit www.GOBikeBoulder.net** for the best biking route to any destination in Boulder. It's fun to use and will even tell you the route mileage, cost savings, calories burned and greenhouse gases saved.
- **Find the quickest bus route** to any destination in Boulder or the Denver metro area using Trip Planner on the RTD Web site (www.rtd-denver.com).
- **Hook up with a carpool partner** through RideArrangers on the DRCOG (Denver Regional Council of Governments) Website (www.drcog.org). Be on the lookout for a new Boulder Valley School District carpool program to be launched in 2010.
- **Maximize your gas mileage** by ensuring your tires are properly inflated. Upgrade to a more fuel-efficient or a hybrid or alternative fuel vehicle when the time comes to replace your car.

By driving less, you could avoid creating at least one ton of greenhouse gases per year.



Waste Not



Waste in landfills emits methane, a greenhouse gas 25 times more potent than carbon dioxide.

- **Put your new single-stream recycling and curbside compost bins to good use.** If you're not sure how the system works, call your trash hauler or the Local Environmental Action Division at (303) 441-4204.
- **Set up a recycling system at work** if there isn't one in place. Consider making a pitch for a zero-waste commitment in your company.
- **If you own a business, join PACE** (Partners for a Clean Environment), and for great ideas on how to reduce business waste, go to www.pacepartners.com

By recycling and composting at home and work, you can save at least 154 pounds of greenhouse gases per year.





Grow Green

Trees are the lungs of the earth—they breathe in carbon dioxide and breathe out oxygen.

- **Plant trees in your yard or on your commercial property.** You might adopt the Boulder forestry division's goal of planting two trees for every one that has died or been removed.
- **Volunteer for a tree-planting event.** There will be many such events throughout the Denver metro area this spring as part of the Mile High Million tree-planting campaign. Sign up at www.green-printdenver.org. Wildland Restoration Volunteers in Boulder (www.wlrv.org) and Volunteers for Outdoor Colorado (www.voc.org) also have re-vegetation projects, though farther afield.

Every tree you plant will absorb an estimated 13 pounds of greenhouse gases from the atmosphere each year.

Join The Community Effort

Join the community of those taking action to meet Boulder's climate action goal!

- **Find a group to join.** Neighborhoods and business groups have formed to take action, share ideas and celebrate successes. Find out if your neighborhood has a climate action group at www.beClimateSmart.com. "10 for Change" is a group of businesses that have taken on the challenge of reducing their energy use by 10 percent over a year. They meet bi-monthly to network and share ideas. Sign up your business for the 10 for Change challenge at www.10forchange.net.
- **Bring others on board.** If you've already done a lot to reduce your greenhouse gas emissions, that's great! Your personal efforts are already captured in Boulder's greenhouse gas inventory. Now we need your help to get other folks on board by sharing what you've done and how you did it with your friends, co-workers and family.

Tell everyone how important it is to take action now to minimize the impacts of climate change. We will achieve success by taking a stand for climate action, both as individuals and as a community.



Appendices



Appendix A – Program Summary

2010 Programs	Average Annual CAP Fund Budget***	Estimated Greenhouse Gas Reduction in 2012 (tons CO ₂ e)	Average Annual CAP \$ per Ton	Average Annual Estimated Private Investment	Estimated Lifetime Energy Cost Savings	Total Cost Per Ton (over life of the measure)
1. Reduce Use						
ClimateSmart at Work						
Commercial "Two Techs and a Truck"	\$807,600	87,800	\$28	\$17,500,000	\$46,358,000	\$(319)
10 For Change	\$61,000	17,000	\$11	\$1,042,000	\$3,213,000	\$(124)
Commercial ClimateSmart Loan Program and Other Financing	\$5,000	4,400	\$3	*	*	*
Energy Code for Existing Commercial Buildings (CECO)	\$10,000	24,000	\$1	\$0	*	*
City Organization Energy Strategy Team	\$5,000	3,800	\$4	\$850,000	\$800,000	\$(132)
Regional Sustainability	\$0	*	***	**	**	*
ClimateSmart at Home						
Residential "Two Techs and a Truck"	\$571,400	58,600	\$29	\$16,500,000	\$26,400,000	\$(159)
Smart Grid	\$7,000	23,000	\$1	\$0	*	\$1
Residential ClimateSmart Loan Program and Other Financing	\$9,000	8,400	\$3	*	*	*
Energy Code for Existing Residential Buildings (RECO)	\$5,000	42,000	\$0.4	\$0	*	*
Total Reduce Use	\$1,481,000	269,000				
<i>Percent of Goal Met</i>		65%				
2. Build Better						
New/Remodel Commercial Building Energy Code	\$0	5,000	**	*	*	*
New/Remodel Residential Building Energy Code	\$0	4,400	**	*	*	*
Total Build Better	\$0	9,400	**	*	*	*
<i>Percent of Goal Met</i>		2%				
3. Ramp Up Renewables						
Windsources and Renewable Energy Credits Promotion	\$9,500	46,000	\$0.2	\$780,000	**	\$17
ClimateSmart Solar Grants and Sales Tax Rebates	\$12,500	900	\$56	\$610,000	\$580,000	\$47
Xcel Energy Franchise Renewal	\$0	*	**	**	**	*
Public Utilities Commission and State Legislature	\$0	*	**	**	**	*
Community-wide Solar Installations	\$1,400	17,000	\$0.1	\$7,164,000	\$2,688,000	\$263
City Hydroelectric and Cogeneration	\$0	22,000	**	**	*	*
City Organization - Renewables	\$4,600	1,200	\$15	**	*	*
Total Ramp Up Renewables	\$28,000	87,000				
<i>Percent of Goal Met</i>		21%				
4. Travel Wise						
GO Boulder	\$100,000	24,000	\$4	*	*	*
City Organization - 90% Alternative Fuel Vehicles and Plug-in Hybrid Electric Vehicles	\$0	1,000	**	**	**	\$424
Total Travel Wise	\$100,000	25,000				
<i>Percent of Goal Met</i>		6%				
5. Waste Not						
Waste Reduction	\$0	6,400	**	**	**	*
<i>Percent of Goal Met</i>		2%				
6. Grow Green						
Urban Forestry	\$0	*	**	**	**	**
TOTAL	\$1,609,000	396,800				
<i>Percent of Goal Met</i>		96%				

* Not Estimated ** Not Applicable ***Does not include American Recovery and Reinvestment Act funding listed in table in Section Four.

Appendix A — Program Assumptions

2010 Programs		Assumptions for Greenhouse Gas Reduction Calculations	
1. Reduce Use			
ClimateSmart at Work			
Commercial "Two Techs and a Truck"	Assumed that 180,000 tons could be reduced through the Commercial and Residential "Two Techs and a Truck" programs with a 60:40 CAP budget investment ratio for the commercial and residential sectors, respectively. Used Econergy (WSP) commercial building analysis for energy cost savings per ton = \$132/ ton.		
10 For Change	Assumed 40,000,000 kWh and 1,200,000 therms total usage from the businesses participating. 10% reduction energy use equals 4,300 tons.		
Commercial ClimateSmart Loan Program and Other Financing	\$12 million is available to businesses in Boulder County. Assumed 50 percent of the funding would be available for businesses in the city. Assumed this \$6 million would go entirely to solar and would allow for approximately 2,000 kW to be installed. This would save approximately 2,200 tons. The impact from energy efficiency improvements financed through the CS Loan Program or other city financing has not been estimated.		
Energy Code for Existing Commercial Buildings (CECO)	Based on analysis from Boulder County's Sustainable Energy Plan, staff determined the 2012 reductions to be approximately 24,000 tons. No reductions will happen in 2009 or 2010.		
City Organization Energy Strategy Team	Governor's goal is to reduce energy use by 20 percent from 2005 levels by 2012 in governmental facilities. In 2005, city emitted 19,000 tons. Staff assumed the use of performance contracts on 20 of the city's largest buildings to achieve the target reduction. These buildings account for nearly 80 percent of the city's energy use. The measures would be fully installed by 2012, but savings would continue beyond.		
Regional Sustainability	Not estimated.		
ClimateSmart at Home			
Residential "Two Techs and a Truck"	Assumed that 180,000 tons could be reduced through the Commercial and Residential "Two Techs and a Truck" programs with a 60:40 CAP budget investment ratio for the commercial and residential sectors, respectively.		
Smart Grid	25,000 homes will get smart meters and achieve an average reduction of .85 tons per home, and 300 businesses will achieve a 6 ton reduction.		
Residential ClimateSmart Loan Program and Other Financing	\$28 million available to residents. Assumed city residents will receive 50 percent. Assumed an average \$10,000 per home at 3 ton reduction per home; 1,400 homes per year.		
Energy Code for Existing Residential Buildings (RECO)	Assumed regulations would be in place between 2010 and 2012 and would reach approximately 15,000 dwelling units; average 2.8 ton reduction per home.		
2. Build Better			
New/Remodel Commercial Building Energy Code	Based on analysis from the County's Sustainable Energy Plan, staff determined the 2012 reduction to be approximately 5,000 tons.		
New/Remodel Residential Building Energy Code	Based on AEC report and 2008 permit activity, staff assumed 100 new homes built per year at 50 percent better than code; 215 remodels and additions with average 3 ton reduction per house.		
3. Ramp Up Renewables			
Windsource and Renewable Energy Credits Promotion	Assumed \$2.00 per 100 kWh block.		
ClimateSmart Solar Grants and Sales Tax Rebates	Based on 2008 grants and rebates.		
Xcel Energy Franchise Renewal	Not estimated.		
Public Utilities Commission and State Legislature	Not estimated.		
Community-wide Solar Installations	Based on 20 percent increase of 2006 - 2008 data.		
City Hydroelectric and Cogeneration	Based on actual production data from city Utilities Department.		
City Organization - Renewables	Staff recently completed a study detailing renewable energy potential of approximately 1MW on 18 city facilities. These systems would be installed by 2012. Staff assumed equal implementation rate over the next 4 years.		
4. Travel Wise			
GO Boulder	Assumed 0.55 tons CO ₂ e/\$ and 0.40 tons CO ₂ e/\$ for business and resident, respectively for Eco Pass investment at a ratio of 70:30 of \$100,000 annually.		
City Organization - 90% Alternative Fuel Vehicles and Plug-in Hybrid Electric Vehicles	In 2009, of 30 vehicles replaced, 14 were E85, 8 were hybrid electric, and 5 were biodiesel capable for a total of 27. Assumed continuation of 90 percent of replacement vehicles will be alternative fuel vehicles.		
5. Waste Not			
Waste Reduction	Based on reductions calculated from waste data submitted by trash haulers operating in the city.		
6. Grow Green			
Urban Forestry	Further analysis needed.		

Appendix B – Residential Energy Retrofit Case Study

ClimateSmart at Home programs have assisted numerous residents with improvements in energy efficiency and renewable energy. Below is a list of typical measures that a home energy audit may identify for reducing greenhouse gas emissions and two examples of retrofits that implement the measures. Estimated costs, rebates, tax credits and loans and the resulting greenhouse gas reductions, energy cost savings and payback times are provided.

Building Statistics

Building Type: Single Family Home

Building Size: 2,000 sq ft

Date Constructed: 1970

Greenhouse Gas Emissions Information

Annual GHG Emissions: 17.7 tons CO_{2e}

Potential GHG Reductions: 10 tons CO_{2e}

Financial Information (Example A)

Total Cost: \$21,915

Potential Annual Energy Cost Savings: \$1,672

Payback:** 13.1 years

Annual CAP Tax: \$40

* Total cost is net cost of all measures (except solar electric) after rebates, incentives and tax credits, plus interest on the ClimateSmart loan.

**Payback period is total cost divided by annual energy cost savings.

Table 1: Potential Energy Efficiency and Renewable Energy Measures Identified Through Energy Audit

Measure	Annual kWh Savings	Annual Therm Savings	Annual Energy Cost Savings*	Capital Cost*	Rebates and Incentives	Federal Tax Credits**	Net Cost	Payback (yrs)
Insulation: Attic, Walls, Perimeter	273	753	\$858	\$3,550	\$300	\$1,065	\$2,185	2.5
Air sealing: ducts, envelope	141	416	\$473	\$1,500			\$1,500	3.2
Replace A/C with Evap. Cooler	950	0	\$105	\$1,600	\$200		\$1,400	13.3
Windows	84	206	\$236	\$8,500		\$435	\$8,065	34.2
HVAC settings	32	130	\$147	\$120			\$120	0.8
Fridge Replacement	500	0	\$55	\$750			\$750	13.6
Hot Water - low flow and setback	0	54	\$6	\$30			\$30	5.0
Lighting - 20 CFLs	403	0	\$44	\$20			\$20	0.5
Plug Load - timers/strips	300	0	\$33	\$35			\$35	1.1
Clothesline Use (75% time)	360	0	\$40	\$20			\$20	0.5
Solar Electric – 1.5kw	2,189	0	\$241	\$12,000	\$5,250	\$2,025	\$4,725	19.6

* Costs and energy savings are estimates and not guaranteed.

** Federal tax credits are dependent upon individual's tax situation.

Table 2: Retrofit Examples

Retrofit Examples	Annual GHG emission reductions (mtCO ₂)	% GHG emissions reductions from baseline	Rebates and Tax credits	Out of Pocket Cost	Climate Smart Loan Amount*	Estimated Annual Loan Payment*	Annual Energy Cost Savings**	Payback (yrs)
Example A: All measures in Table 1 EXCEPT solar electric	10	53%	\$2,000	\$975	\$13,150	\$1,396	\$1,672	13.1
Example B: All measures in Table 1 + 1.5kW Solar Electric	12	64%	\$9,275	\$975	\$17,875	\$1,898	\$1,955	15

* Assumed 15 year loan at 6.75% for eligible measures: insulation, sealing, evaporative cooler, windows, solar electric.

** Packaged energy cost savings are less than the sum of the parts due to interactions between measures.

*** Payback period should not be confused with the positive annual cash flow provided by the loan structure.

Appendix B – Commercial Energy Retrofit Case Study

ClimateSmart at Work programs have assisted numerous businesses with improvements in energy efficiency and renewable energy. Below is a list of typical measures that a commercial energy audit may identify for reducing greenhouse gas emissions and two examples of retrofits that implement the measures. Estimated costs, rebates and loans and the resulting greenhouse gas reductions, energy cost savings and payback times are provided.

Building Statistics

Building Type: Commercial Office Space

Building Size: 57,000 sq ft

Greenhouse Gas Emissions Information

Annual GHG Emissions: 1,527 tons CO₂e

Potential GHG Reductions: 503 tons CO₂e

Financial Information

Total Cost*: \$35,788

Potential Annual Energy Cost Savings: \$26,004

Payback:** 1.4 years

Annual CAP Tax: \$1,297

* Total cost is net cost of the measures in Example A after rebates and incentives.

**Payback period is total cost divided by annual energy cost savings.

Table 1: Potential Energy Efficiency and Renewable Energy Measures Identified Through Energy Audit

Measure	Capital Cost*	Xcel Energy Rebates and Incentives	Net Cost	Annual Energy Savings* (kWh)	Demand Savings (kW)	Annual Gas Savings (therms)	Annual Energy Cost Savings	Payback (yrs)
HVAC Settings	\$5,600	\$0	\$5,600	177,542	0.0	3,883	\$9,437	0.6
Lighting Retrofits	\$33,400	\$9,870	\$23,530	326,764	34.9	-2,194	\$15,439	1.5
Lighting Controls	\$5,590	\$984	\$4,606	26,458	0.0	-148	\$781	5.9
Install Premium Motors	\$2,352	\$300	\$2,052	6,390	0.7	0	\$347	5.9
Evaporative Cooling	\$114,450	\$16,800	\$97,650	81,549	84.0	0	\$12,746	7.7
Install 10 KW PV System	\$90,000	\$73,150	\$16,850	14,590	10	0	\$2,250	7.5
Install Cool Roof	\$285,000	\$6,760	\$278,240	16,599	33.8	-1,856	\$4,882	57

* Costs and energy savings are estimates and not guaranteed.

Example A below includes implementation of HVAC settings, lighting retrofits and controls, and premium motors. Example B includes all the measures in Example A, plus evaporative cooling and a 10 kW solar system. While this example only marginally increases greenhouse gas reductions, it shows how more expensive measures may be financed through the ClimateSmart Loan Program.

Table 2: Retrofit Examples

Retrofit Examples	Annual GHG emissions reduction (mtCO ₂ e)	% GHG emissions reductions from baseline	Rebates and Incentives	Out of Pocket Cost	Climate Smart Loan Amount*	Annual Loan Payment*	Annual Energy Cost Savings	Payback (yrs)
Example A	503	33%	\$11,154	\$35,788	-	-	\$26,004	1.4
Example B	592	39%	\$101,104	\$35,788	\$114,500	\$12,159	\$38,975	7.4**

* Assumed 15 year loan at 6.75% for solar and evaporative cooling only, due to their high cost and longer payback.

** Payback period should not be confused with the positive annual cash flow provided by the loan structure.